

FUEL-GAS FROM WATER.

Much attention has recently been directed to the Lowe & Strong processes for producing a cheap gas by the decomposition of water, which in the form of steam is brought in contact with incandescent carbon. The experiments that have lately been made in Sweden and Russia have been attended with favorable results, and several scientific men, some of them government officials, declare "that the gas has by us been employed for welding wrought iron, for smelting in crucibles as well as pig iron as steel; that the results of these experiments have been very satisfactory as to the heating power of the gas. On the other hand, we can confirm the statement that the employment of the gas for cooking purposes causes extraordinary saving in the household department, and that the cleanliness and convenience of its use must make it a favorite with all housekeepers."

The gas was used in a small baking and roasting stove, which required a gas consumption of only fourteen feet an hour, maintaining a constant heat of 275° centigrade.

For illumination the gas was conducted through a vessel filled with cotton moistened with benzine, and the result was eminently satisfactory.

NEW USE FOR PAPER.—A great diversity presents itself in the various useful purposes to which paper, or *papier mache*, has been applied of late years. Besides ornamental articles, clothing, bedding, stamps, boxes, barrels, picture frames, furniture, stovepipes, chimney-pots, bricks, partition walls, carriage and car wheels and boats, it would seem as if the inventive ingenuity of manufacturers has succeeded in adapting this single substance to some new use every day. The last remarkable application of *papier mache* is the manufacture of a revolving dome for the astronomical observatory of Prof. Greene of the Polytechnic Institute at Troy. This dome has an internal diameter of 29 feet, and if constructed in the usual manner, would weigh five or six tons and require powerful and complicated machinery to manipulate it, besides also requiring foundations of considerable depth for its support; whereas the total weight of the paper dome will not exceed a ton and three-quarters, and, mounted on pivots working in iron grooves, is capable of being revolved in any direction required without the assistance of any machine or apparatus of any kind. The paper is put upon a light framing of wood, and is, by means of a special preparation, rendered fully as hard and even more rigid than wood.

EUROPEAN STOVE.—In Russia, Sweden, Norway, and all Northern Europe, stoves are usually built of brick, covered with porcelain and placed while building in the house. They are of the size of a large and very high chest of drawers, and usually stand in the corner of the room. The fire is burned in a furnace near the bottom, and the heated smoke is made repeatedly to traverse the structure from side to side, along a winding passage, before it reaches the top, where a pipe conveys it, now comparatively cold, into a flue in the wall. The heated mass of brick continues to warm the room long after the fuel is burned. It is generally sufficient to warm the stove once a day. The same quantity of wood or turf burned in an open grate would be consumed in an hour, and would hardly be felt. There is one of these stoves in every room.

PURITY OF MILK.—It is stated in a German paper, that the purity of milk may be tested by the following very simple method: A well-polished knitting needle is dipped into a deep vessel of milk, and immediately withdrawn in an upright position; when, if the sample be pure, some of the fluid will be found to adhere to it, while such is not the case if water has been added to the milk, even in the smallest proportions.

THE HELIOGRAPH.—Devices for signaling, very similar to the heliograph or "sun writer," have been in use for ages. As far back as the Persian invasion of Greece, polished metal surfaces were used to flash the rays of the sun and give warnings of one kind or another. The signaling in this and other cases was, however, imperfect, and could not be carried on over a space of more than 18 miles. But the instrument now in use, the Mance heliograph, is a great improvement, for it not only concentrates the sun's rays but it flashes them with the utmost precision to any required spot, irrespective of the relative location of the sun. It is also provided with a finger key, so that flashes may be made of long or short duration, thus permitting the employment of the Morse telegraphic alphabet. Under favorable conditions intercourse has been carried on through the medium of two of these instruments over a distance of nearly 100 miles, and at several points occupied by the English army in Afghanistan, regular communication is maintained at distances of not less than 50 miles by heliographic signals. The instrument weighs only seven pounds and can be carried and worked by one man. It is, of course, useless in cloudy weather. It has already been proposed to establish a systematic telegraphic communication between various islands in the West Indies by this process, and before long it will be adopted as a means of signaling between vessels when at sea.

THE LATEST TELEPHONE.—At a recent meeting of the Society of Telegraph Engineers in London, an interesting feature was the disclosure made by Major Webber, R. E., to the effect that he had recently experimented with a remarkable new carbon telephone from America, which owed its power to a diaphragm of animal tissue. With this instrument, which was not further described, Major Webber was able to speak in a low tone over 70 miles of wire with perfect clearness. A part of this line consisted of underground cable, in which from 20 to 30 other circuits were busily at work without interfering with the telephonic message. The voice of this instrument was singularly full and life-like, whereas that of magneto-telephones is peculiarly thin and parrotty. This experiment is completely cast in the shade by the successful working of an ordinary telephone perfectly through 195 miles of wire. This was accomplished by Lieut. Reade, of the United States Military Telegraph, between San Diego and Fort Yuma. The old-fashioned telephones of years ago had a diaphragm of animal tissue and could be used at remarkably long distances without any magnetic current at all. It is now very certain that the power of the telephone to transmit vibrations does not depend on the diaphragm so much as upon the medium which transmits them, and even now diaphragms are being dispensed with. So Major Webber has not discovered anything very new or curious.

PREHISTORIC REMAINS IN OREGON.—The coast of the Pacific ocean some distance below the mouth of the Columbia and above, even to the colder latitudes, shows in its shell mounds or beds evidences of a dense population that must have long ago lived and thrived on the bounteous sea-food that the ocean provides. Up the little streams and inlets may these beds also be found. Excavations made at Clatsop beach, Oregon, show a depth of six feet of shells, human bones and skulls without having reached the original dirt stratum. The length of this bed is unknown and its age can only be imagined. It is in shore half a mile, and in ancient times must have been the beach proper. Ages have passed since these wild people encamped by the booming waves, for immense old firs, five and six feet in diameter, are growing over the giant trees that preceded them. No implements of any kind have as yet been found in these beds. It is said that similar beds are found on the Alaska coast, also remains of ancient junks.—*American Antiquaries.*

UNDERGROUND TELEGRAPHING.—Two systems have been proposed. In one, known as the Alberger plan, tubes of glass are prepared of a convenient length and about one-eighth inch internal diameter, in which a steel wire is introduced. This compound tube is then inserted in an iron one, the whole brought to a welding heat in a furnace, and then rolled, reducing the iron pipe so as to make a solid mass of pipe, glass and coating. The coating of iron acts as a shield and an arrester of induced currents. The wire being perfectly insulated is capable of working to a higher capacity and with less resistance than any other system. The wires are buried in the ground, a battery attached to the first piece of pipe and the pieces connected by the ordinary telegraphic tie—testing with a galvanometer as the work progresses. A bell-shaped sleeve somewhat larger than the pipe is drawn over each joint when connections are made, and an insulating fluid poured into the sleeve through an orifice in the center, thus making a joint impervious to moisture and perfectly insulated. The second system is the invention of David Brooks, the well-known electrician. The wires wrapped in cotton, 20, 30 or more are placed in an iron pipe, and after being laid in the ground oil is introduced and allowed to run its entire length, the source of supply being an elevated vessel always kept full so as to keep a constant pressure on the oil already there. These pipes have been laid in Philadelphia. The strong point in their favor is economy. Any number of wires may be enclosed in a small space, while the work of laying them does not involve much expense. Once in place they are free from disturbances of all kinds.

TELEPHONES WITHOUT DIAPHRAGMS.—M. Ady reports some experiments confirmatory of the views of Du Moncel, upon telephones without diaphragms. He has often observed that the reproduction of words and sounds, which are occasioned by the interruption of currents, can be made in these telephones with a different quality, and upon a higher or lower pitch, according to the degree of tension which is given to the iron wire; but if the fundamental sound of the wire is muffled by holding it between the fingers, the sounds which are reproduced become dull, a little more feeble, and always in the same tone. He concludes from his experiments, that the sounds which are produced by a magnetic nucleus are probably the result of shortenings and lengthenings of the wire, determined by rapid magnetizing and demagnetizing, the molecular vibrations of the magnet producing the effects of the telephone, and the iron diaphragm only strengthening the vibrations, and rendering them more sensible to the ear by its own vibrations. We know it is possible to replace the iron plate of the receiver by non-magnetic substances, as a plate of copper, glass, wood and even cardboard. The magnet does not exercise any particular action upon the diaphragm. The mistake was not in the fact but in the cause, the substance of the diaphragm receiving the molecular vibrations and communicating them to the ear.

WIREDOUND SHEAVES AND THE MILLERS.—The millers of the Western States of America have set themselves against the use of wired-bound reaping machines on the ground that the wire gets into the flour and off-*l*, and injures the milling machinery. The Minnesota millers have agreed not to buy wheat that has been bound with wire, except at a reduction of 10 cents per bushel. As nearly all the self-binding reapers of America bind with wire, this proposed action of the millers is a serious one for the farmers, and for the makers of the American sheaf-binding reaping machines. It is doubtful, however, whether they will have power to carry it into effect. No string-binder has yet been uninterruptedly successful in ordinary field use, though two or three are now before the public, and will probably be perfected after another harvest.